Recommendations for management of pain in patients following gunshot & mine-blast wounds, including amputation for use in Ukraine

Contents

An overall strategy for acute pain management after gunshot or mine-blast wounds, including amputation 3

Table 1 Non –opioid analgesics, non-steroidal anti-inflammatory medications, non-selective and selective COX2 inhibitors 4

Table 2 Opioids for acute pain 5

Table 2[i] Naloxone should be available when opioids are given. 6

Table 2 [ii] Inhalational analgesic at sub- anaesthetic doses for moderate-severe pain or procedural pain 6

Table 3 Adjuvant [i] Management of neuropathic pain in acute pain conditions 7

Table 4 Adjuvant [ii] Sub-anaesthetic ketamine for managing acute pain in military casualties 8

Table 5 Regional analgesia 9

Upper Limb Amputation (Arm / Forearm / Hand) 9

Lower Limb Amputation (Thigh / Leg / Foot) 9

Recommended Duration and Maintenance of Continuous Peripheral Nerve Catheters in Combat Trauma and Amputation Patients 10

Local Anesthetic Doses for Regional Analgesia in Amputation 11

Commonly Used Local Anesthetics 11

Typical Volumes by Block (Adult, Ultrasound-Guided) 11

Upper Limb Amputation 11

Lower Limb Amputation 11

Continuous Peripheral Nerve Block (CPNB) – Typical Regimens 12

Dexamethasone as adjuvant 12

Tapering off of medications 13

Principles of assessing pain & neuropathic in communicating vs and non-verbal adult patients 14

Validated tools for assessing pain and neuropathic pain in adults 15

Communicating adults 15

Non-communicating adults 16

A tool screening for Neuropathic pain DN4 and DN2 18

References 19

The recommendations that follow aim to assist clinicians in managing the care of soldiers and civilians with war-related injuries during hospitalization, particularly at stages when patients experience acute pain before or after surgery.

The information in this document is not intended to be, and should not be considered, as substitute for medical or other professional advice. Treatment for the conditions described in this document is highly dependent on the individual circumstances. While the information here is designed to offer accurate information with respect to the subject matter covered and to be current as of the time it was written, research and knowledge about medical and health issues is constantly evolving and dose schedules for medications are being revised continually, with new side effects recognized and accounted for regularly.

Readers must therefore always check the product information and clinical procedures with the most up- to- date published product information and data sheets provided by the manufacturers and the most recent codes of conduct and safety regulations.

An overall strategy for acute pain management after gunshot or mine-blast wounds, including amputation

Step	Pain Severity	Analgesic group	Routes	Comments
Step 1 – Mild Pain	Pain score ≤ 3/10; Patient is able to ambulate and perform tasks; pain is mild when coughing or taking a deep breath	**Non-opioid base ->** see non-opioids Table 1 **If screening for neuropathic pain is positive,** consider treatment -> see Table 3 • Consider **non-pharmacological interventions**: eg TENS, physiotherapy, psychological support, virtual reality • Consider regional analgesia - see Table 5	Oral (PO) preferred. IV paracetamol for early post-operative care. Avoid the IM route if more than one dose is expected -> absorption is unreliable & administration is painful	▪ Assess pain & record the measurements on a regular basis. See the section about pain assessment, below. ▪ Screen for neuropathic pain once every 7-10 days. ▪ Maintain scheduled dosing rather than "as needed" for consistent pain control.
Step 2 – Moderate Pain	Pain score 4–6/10; The pain limits function . eg when taking a deep breath or coughing or moving in bed or getting out of bed	**Non-opioid as base and COMBINE with a r short-acting opioid** -> see Opioid Table 2 If screening for neuropathic pain is positive – consider treatment -> see Table 3. • Consider **non-pharmacological interventions**: eg TENS, physiotherapy, psychological support, virtual reality • Consider inhalation -> see Table 2 [ii] • Consider regional analgesia -> see Table 4.	PO or IV depending on patient tolerance	▪ As above ▪ Once opioids are initiated, start treatment against constipation
Step 3 – Severe Pain	Pain score ≥ 7/10; Pain at rest and during movement eg when taking a deep breath or coughing or moving in bed or getting out of bed May have surgical drains	**An opioid (Table 2) AND non-opioid analgesic (Table 1) AND adjuvant (Table 3 & 4) - treat neuropathic pain, if relevant and/or ketamine** • Consider regional analgesia: see Table • Consider non-pharmacological interventions: eg TENS, physiotherapy, psychological support, virtual reality. • Consider: cryoanalgesia, peripheral nerve stimulation. hydrodissection, radiofrequency procedures.	IV or via PCA; regional block if feasible	▪ As above ▪ Assess for opioid-related side effects: monitor respiratory rate, SpO_2, sedation, nausea ▪ Start treatment for constipation ▪ Assess ketamine treatment related side effects, see the relevant section, below.

Table 1 Non –opioid analgesics, non-steroidal anti-inflammatory medications, non-selective and selective COX2 inhibitors

Based on Buckenmaier, C. C., II. (2020). Acute pain management in the deployed environment [1]

Medication	IV / IM	Oral		Comments
		Single dose	**Max daily dose**	
Paracetamol	1000 mg	PO 500 – 1000 mg SL 500 mg X2	4000 mg	Weak analgesic and anti-inflammatory effect; does not produce gastric irritation, hepatotoxic in high doses.
Naproxen	NR	250-500 mg every 12 h	1000mg	Longer half-life allows twice-daily dosing
Dexketoprofen	25-50 mg	50 mg every 6-8 hours	150 mg	
Ketorolac	15-30 mg every 6 hours	10 - 30mg every 4-6 hours	120 mg	Administer for no longer than 5 days 30 mg IV is equivalent to IO mg of morphine; Has moderate anti-inflammatory activity; may cause life threatening bronchospasm in asthma patients
Diclofenac	IM 75 mg		150 mg	
Ibuprofen	400-600 mg every 6-8 hrs IV: Give as slow infusion over 30 min	400-800 mg every 6-8 hr	PO: 2400 mg IV: 3200 mg	Higher incidence of gastrointestinal events compared to COX·2 selective inhibitor, eg celecoxib
lndomethacin	NR	25-50 mg every 8 hr	150mg	Potent anti-inflammatory
Celecoxib	NR	400mg loading dose followed by 100-200 mg 1-2 daily	400mg	Highly selective COX·2 inhibitor: lower incidence of serious gastrointestinal events compared to nonselective COX inhibitors ibuprofen and naproxen: lower incidence of renal events than ibuprofen
Parecoxib	20-40 mg every 6-12 hrs	NA	80mg	
Meloxicam	NA	7.5-1S mg once a day		90%selective for COX·2 inhibition; longer half-life allows for daily dosing Mild to moderate pain
Nefopam hydrochloride	20 mg every 4–6 hrs Infuse slowly over 15-20 min	30–60 mg every 8 hr	Oral – 180 mg IV - 120 mg	
Metamizole	1000 mg Infuse slowly	500 – 1000 mg every 6 to 8 hrs	4000mg	
Ketoprofen	50-100 mg every 6-8 hrs Infuse slowly – over 15-30 min	50-100 mg every 6-8 hrs	PO 200 mg? IV 200 mg	

Table 2 Opioids for acute pain

Based on Buckenmaier, C. C., II. (2020). Acute pain management in the deployed environment [1]

Start with immediate release formulations for titration; when longer term care is needed, change to slow-release formulations

Opioid	Intravenous /Subcutaneous	PCA	Oral	Epidural	Intrathecal	Comments
Tramadol	50-100 mg every 4-6 hr	NA	Immediate release 50-150 mg every 4-6 hr Controlled release xxx	NA	NA	Can decrease threshold to seizures.
Morphine	IV 2-3 mg (titrated at intervals of at least 2 minutes – (IV 0.1 mg/kg)	1-2 mg with lockout interval of 6-12 min	10-30 mg every 2-3 hrs	1-4 mg X once daily	100-300 µg X once daily	Active metabolites can accumulate in renal dysfunction, leading to cause respiratory depression and increased intracranial pressure.
Fentanyl	Not available in Ukraine	Not available in Ukraine	Not available in Ukraine	Not available in Ukraine	Not available in Ukraine	Synthetic opioid Transdermal (=patch) 50-100 µg /h – **The transdermal route is not recommended for acute pain management. Takes 24-48 h until steady state pain relief is achieved.**
Methadone hydrochloride	5-10 mg every 8-12 hours, short term use	NA	5-15 mg every 8-12 hours, short term use	NA	NA	Synthetic opioid, exhibits NMDA receptor antagonist activity; long half life provides more stable analgesia compared to more frequency dosed opioids
Oxycodone	Not available in Ukraine	Not available in Ukraine	Immediate release: **5**-10-20 mg every 4-6 hr Controlled release: 5-80 mg. Typical starting dose: 10mg X 2 day. OR convert from total immediate release dose.	NA	NA	

Table 2[i] Naloxone should be available when opioids are given.

Situation	Initial Dose	Repeat	Comments
Suspected opioid overdose	0.04 mg (40 µg) IV	If no response after 2 min → increase stepwise to **0.1 mg**, then **0.2 mg**, **0.4 mg**, **2 mg**, and **4 mg** every 2–3 min as needed. The effect is dose dependent, lasting ~ 20 to 60 minutes	▪ Use **lowest effective dose** to restore adequate ventilation while minimizing withdrawal. ▪ Avoid overshooting as can lead to withdrawal hypertension, tachycardia, or pulmonary edema. ▪ Always provide **airway support and oxygen** while naloxone takes effect
No IV access	0.4–2 mg IM or SC	Repeat every 2–3 min as needed (up to 10 mg total). If no response, reconsider diagnosis.	
Intranasal formulation	4 mg (one spray) into one nostril	Repeat every 2–3 min if inadequate response (alternate nostrils).	

Table 2 [ii] Inhalational analgesic at sub- anaesthetic doses for moderate-severe pain or procedural pain

Methoxyflurane inhalation	Follow manufacturers recommendations **Parameter** **Recommendation** Initial dose 3 mL via inhaler Additional dose Additional 3 mL if required Maximum per day 6 mL

Table 3 Adjuvant [i] Management of neuropathic pain in acute pain conditions

Medication	Oral		Comments
	Single dose	Max daily dose	
Strong recommendation for use			
α2δ-ligands			
Pregabalin		Pregabalin 150–600 mg in two divided doses	1-2 hours before surgery: administer PO 150–300 mg pregabalin, OR PO 600–1200 mg gabapentin [2] First line therapy for neuropathic pain as recommended by Soliman et al, 2025.[3]
Gabapentin	IR 400-1200 mg CR: 600 – 1800 mg	▪ Gabapentin 1200–3600 mg in three divided doses ▪ Gabapentin extended release 1200–3600 mg in two divided doses	First line therapy for neuropathic pain as recommended by Soliman et al, 2025
Selective serotonin reuptake inhibitors			
Duloxetine	60–120 mg X1	60–120 mg	First line therapy for neuropathic pain as recommended by Soliman et al, 2025
Venlafaxine		150–225 mg once a day or in two divided doses	First line therapy for neuropathic pain as recommended by Soliman et al, 2025
Anti -depressants Amitriptyline		25–150 mg once a day or in two divided doses	First line therapy for neuropathic pain as recommended by Soliman et al, 2025 TCAs are not recommended in older adults because of their anticholinergic and sedative side effects and increased potential risk of falls

Inconclusive evidence for use for management of neuropathic pain based on Soliman et al, 2025

- Carbamazepine–oxcarbazepine
- Lacosamide
- Lamotrigine
- NMDA receptor blockers
- Selective serotonin reuptake inhibitors
- Transcranial direct current stimulation
- Transcutaneous electrical nerve stimulation
- Spinal cord stimulation
- Topiramate

Inconclusive evidence for use for management of neuropathic pain based on Soliman et al, 2025

- Cannabinoids
- Valproate
- Levetiracetam
- Mexiletine

Table 4 Adjuvant [ii] Sub-anaesthetic ketamine for managing acute pain in military casualties

Taken from: Buckenmaier, C. C., II. (2020). Acute pain management in the deployed environment

Dissociative effects of ketamine may start at doses in the 0.43-0.65 mg/kg range.[4]

Route	Dose	Comments
Bolus and continuous infusion	Analgesic ketamine IV bolus • 0.1–0.3 mg/kg Infusion • 0.05–0.3 mg/kg/h Maximum without ICU monitoring • 0.5 mg/kg/h	Check the formulation avaible to you and adjust the dose accordingly. Dose requirements may differ between ketamine formulations because esketamine (S-ketmamine) is more potent than racemic ketamine (S-ketmaine and R-ketamine) S-ketamine is registered in Ukraine, but currently, only racemic ketamine is available.
Oral	500 µgr /kg	

- Sub-anaesthetic concentrations of ketamine can provide postoperative anti-hyperalgesia, analgesia, and an opioid- sparing effect when used in combination with opioid.
- Side effects associated with administration of ketamine can include: bad dreams, hallucinations, dizziness, dysphoria, disorientation, and confusion.

Monitoring a patient while infusing sub-anaesthetic doses of ketamine for management of acute pain

Parameter to Monitor	Key Findings / Recommendation
Pain score	Assess at baseline and regular intervals to evaluate efficacy.
Sedation level	Continuous monitoring of consciousness and sedation recommended; use structured scales (e.g, Richmond Agitation-Sedation Scale or Ramsay). Aim: mild sedation (RASS 0 to −1).
Mental status / Psychomimetic effects	Observe for hallucinations, dysphoria, agitation, and dissociation; reduce dose or administer benzodiazepine use if severe.
Hemodynamics (BP, HR)	Ketamine increases sympathetic tone; monitor BP/HR every 15–30 min initially and hourly thereafter. Reduce or stop infusion if >20% above baseline.
Respiratory rate / SpO_2	Though ketamine preserves airway reflexes, concurrent opioid/sedative use increases risk; monitor RR and SpO_2 regularly.
Nausea / Vomiting	Nausea/vomiting is common; routine monitoring advised; treat with antiemetics if necessary.
Urine output (for prolonged use)	For infusions >24 hours, monitor for reduced urine output and symptoms of cystitis
Overall documentation and reassessment	Continuous documentation of vital signs, sedation, and adverse effects is essential for titration and safety.

Based on:

1. Schwenk ES, et al. *Consensus Guidelines on the Use of Intravenous Ketamine Infusions for Acute Pain Management.* **Reg Anesth Pain Med.** 2018;43(5):456–466.
2. U.S. Department of Veterans Affairs / Department of Defense. *Ketamine Infusion for Acute Pain Management – Clinical Practice Guideline.* 2021. VA Ketamine Protocol PDF

Table 5 Regional analgesia

Regional Analgesia for Amputation (Combat & Trauma Settings) (prepared by Prof Dmytro Dmytriiev)

Upper Limb Amputation (Arm / Forearm / Hand)

Block	Target nerves	Indications	Key benefits in amputation	Clinical notes
Interscalene block	Brachial plexus (C5–C7)	Shoulder / proximal arm amputation	Excellent proximal analgesia	Avoid in severe chest trauma (phrenic block)
Supraclavicular block	Brachial plexus	Arm / forearm amputation	Dense analgesia of entire limb	US guidance essential (pneumothorax risk)
Infraclavicular block	Brachial plexus cords	Distal arm, forearm amputation	Stable catheter placement	Less shoulder coverage
Axillary block	Terminal branches	Forearm / hand amputation	Low respiratory risk	Requires multiple injections
Peripheral nerve catheters	Individual nerves	Post-amputation analgesia	↓ Opioids, ↓ phantom pain risk	Infection control critical

Lower Limb Amputation (Thigh / Leg / Foot)

Block	Target nerves	Indications	Key benefits in amputation	Clinical notes
Fascia iliaca block	Femoral + LFCN	Hip, thigh amputation	Fast, field-adapted	Obturator often spared
Femoral nerve block	Femoral nerve	Above-knee amputation	Strong anterior thigh analgesia	Quadriceps weakness
Sciatic nerve block (subgluteal)	Sciatic nerve	Above-knee amputation	Major posterior coverage	Positioning may be limited
Popliteal sciatic block	Tibial + common peroneal	Below-knee amputation	Distal analgesia, preserves knee	No proximal thigh coverage
Adductor canal block	Saphenous nerve	Below-knee amputation	Sensory block, preserves motor	Needs sciatic combination
Continuous nerve catheters	Femoral / sciatic	Post-amputation period	↓ Acute pain & phantom limb pain	Requires trained follow-up

Key Clinical Concept - Early, targeted regional analgesia—especially using continuous peripheral nerve blocks—is a cornerstone in managing acute post-amputation pain and may play a role in reducing the incidence and severity of phantom limb pain, particularly in combat trauma.

Recommended Duration and Maintenance of Continuous Peripheral Nerve Catheters in Combat Trauma and Amputation Patients

Parameter	Recommendation	Clinical Rationale
Minimum catheter duration	**48–72 hours**	Provides effective postoperative analgesia during the period of highest pain intensity.
Extended catheter duration	**Up to 5–7 days** in selected patients	Consider for major amputations, repeated surgical debridements, severe trauma, or high risk of phantom limb pain.
Daily catheter assessment	Mandatory	Evaluate insertion site, catheter integrity, analgesic efficacy, sensory/motor effects, and signs of complications.
Insertion site inspection	At least once daily	Early detection of infection, leakage, dislodgement, or local inflammation.
Bacterial filter management	Replace according to manufacturer recommendations and institutional infection-control policies, particularly during prolonged infusions (>72 h)	Reduces risk of catheter-related infection during extended use.
Aseptic handling	Required during all manipulations and dressing changes	Minimizes microbial contamination and infectious complications.
Catheter removal	Immediately if infection, catheter malfunction, local anesthetic toxicity, or lack of clinical benefit occurs	Ensures patient safety and prevents adverse events.

Key Clinical Concept: Continuous peripheral nerve catheters maintained for **5–7 days** after major combat-related amputation may improve acute pain control, facilitate rehabilitation, reduce opioid consumption, and potentially decrease the risk of developing phantom limb pain or lessen its severity.

Local Anesthetic Doses for Regional Analgesia in Amputation

Commonly Used Local Anesthetics

Local anesthetic	Single-shot block	Continuous infusion (catheter)	Max safe dose (without epinephrine)
Lidocaine 1–2%	3–5 mg/kg	✖ not recommended	**4.5 mg/kg** (max 300 mg)
Lidocaine + epi	5–7 mg/kg	✖	**7 mg/kg**
Bupivacaine 0.25–0.5%	2–3 mg/kg	0.1–0.2 mg/kg/h	**2.5 mg/kg** (max 175 mg)
Ropivacaine 0.2–0.5%	2.5–3 mg/kg	0.2–0.4 mg/kg/h	**3 mg/kg**
Levobupivacaine 0.25–0.5%	2–3 mg/kg	0.1–0.2 mg/kg/h	**2 mg/kg**

Always calculate total dose across all blocks.

Typical Volumes by Block (Adult, Ultrasound-Guided)

Upper Limb Amputation

Block	Typical LA	Volume
Interscalene	Ropivacaine 0.5%	10–15 ml
Supraclavicular	Ropivacaine 0.5%	20–25 ml
Infraclavicular	Ropivacaine 0.5%	20–30 ml
Axillary	Ropivacaine 0.375–0.5%	20–30 ml

Lower Limb Amputation

Block	Typical LA	Volume
Fascia iliaca	Ropivacaine 0.25–0.375%	30–40 ml
Femoral nerve block	Ropivacaine 0.375–0.5%	15–20 ml
Sciatic (subgluteal)	Ropivacaine 0.5%	20–25 ml

Block	Typical LA	Volume
Popliteal sciatic	Ropivacaine 0.375–0.5%	15–20 ml
Adductor canal	Ropivacaine 0.25–0.375%	10–15 ml

Continuous Peripheral Nerve Block (CPNB) – Typical Regimens

Block	LA & concentration	Infusion rate
Infraclavicular catheter	Ropivacaine 0.2%	5–8 ml/h
Femoral catheter	Ropivacaine 0.2%	5–10 ml/h
Sciatic catheter	Ropivacaine 0.2%	3–6 ml/h
Popliteal catheter	Ropivacaine 0.2%	4–6 ml/h

Dexamethasone as adjuvant

Route	Dose
Perineural	4 mg
IV	4–8 mg

Comment: Dexamethasone prolongs block duration and reduces rebound pain.

Tapering off of medications

- Consider tapering medications- particularly opioids, gabapentinoids, and antidepressants -when :
  - There is no sustained clinically meaningful improvement in pain/function.
  - There are serious adverse effects or aberrant behaviours.
  - The patient requests tapering.
- Reassess periodically for signs that suggest dose reduction is warranted.

Tapering strategy for opioids. Recommendations how to carry this out are listed in the VA/DoD Clinical Practice Guideline addressing *The Use of Opioids in the Management of Chronic Pain* [5]

- Safety permitting, a gradual taper rate (consider a 5-20% reduction every 4 weeks or longer, adjust or pause as needed) allows time for neurobiological, psychological, and behavioral adaptations.
- Tapering plans should be individualized based on patient goals and concerns, treatment characteristics, and safety considerations.
- The VHA Pharmacy Benefits Management Academic Detailing Service offers example tapers for opioids in their Opioid Taper Decision Tool: A VA Clinicians Guide. Examples are provided for four taper rates: slowest, slower, fast, and rapid tapers.
- When there are concerns regarding risks of tapering (e.g., unmasked opioid use disorder, exacerbation of underlying behavioral health conditions), consider interdisciplinary services that may include behavioral health, specialty substance use disorder, primary care, specialty pain care, and complementary and integrative health interventions
- Provide patient education to address concerns that may negatively impact taper (e.g., inability for adequate follow-up, inability to provide adequate treatment for co-occurring medical and behavioral health conditions, including substance use disorder, address anxiety concerns)

Gabapentinoids

- Standardized clinical practice guidelines for tapering *gabapentin* or *pregabalin,* when used for treatment of acute or neuropathic pain, are lacking. The following are expert-based recommendations:
- Taper **gabapentin** over at least 2 weeks if receiving high doses (≥ 900 mg per 24 hours) for at least 4 weeks [6]

Principles of assessing pain & neuropathic in communicating vs and non-verbal adult patients

1. Assessment of pain intensity should be performed as soon as possible and at all stages of treatment, as well as after administration of every analgesic medication or use of regional analgesia techniques.
2. The intensity of pain, according to the appropriate scales, should be reflected in the dynamic observation diary, intensive care record, or other medical documentation of the relevant stage of treatment.
3. Select individual scales for use and familiarize yourself with the specifics of their use.
4. Diagnostics of pain intensity is performed by a nurse on duty every 4 hours and is reflected in the medical records listed in paragraph 2 of this section.
5. Additional diagnostics are performed before and after anesthesia (in accordance with the route of administration of the drug, taking into account pharmacodynamics and pharmacokinetics).
6. Data on pain intensity is mandatory for monitoring.

How to carry out assessment of pain

1. To assess pain intensity, it is recommended to use the scales which are described in detail below.
   a. Patients who are able to self-report can use the:
      i. numerical rating scale (=NRS)
      ii. category scale
      iii. Defense and Veterans DoD/VA Pain Rating Scale
   b. For assessing pain in patients with impaired consciousness, including intubated patients, staff can use the
      i. Behavioral Pain Scale (BPS)
      ii. Critical-Care Pain Observation Tool (CPOT).
2. Intensity of pain is generally classified into the following 3 sub-groups, pain which is beyond mild pain, ie ≥4/10, is generally regarded as clinically relevant and should be treated.
   a. Mild pain
      i. for communicating patients: NRS 1-3/10;
      ii. For non-communicating patients: BPS ≤ 3, CPOT ≤ 2
   b. Moderate pain:
      i. For communicating patients NRS 4-6/10;
      ii. For non-communicating patients BPS ≤ 3, CPOT ≤ 2
   c. Severe pain:
      i. For communicating patients NRS 7-10/10; .
      ii. For non-communicating patients BPS ≤ 3, CPOT ≤ 2
3. Assess the pain at REST and MOVEMENT which is related to the patient's stage of recovery. e.g. in the days after surgery – assess extent that the patient is able to cough or take a deep breath; in later days – to move out of bed and walk some steps.
4. Quality criteria: aim to reduce pain intensity to a level that the patient is able to function, eg breath or cough without it causing more that mild pain or discomfort.
5. Screening of neuropathic pain can be carried out using a questionnaire such as the Douleur Neuropathique 4 questions (DN4).
   a. The DN4 consists of 2 parts:
      i. DN2 - self assessment by the patient– 7 questions
      ii. DM4 - self assessment by the patient (DN2) and also assessment of 3 items by a clinician.
   b. Self assessment (=DN2): a score of ≥3 is indicative of neuropathic pain
   c. Self assessment and clinical assessment (=DN4): a score of ≥4 is indicative of neuropathic pain

Validated tools for assessing pain and neuropathic pain in adults

Communicating adults

Numerical pain rating scale

The numerical rating scale can be used orally or in writing. Regardless of the form, patients are asked to rate the intensity of their pain on a 10-point scale from 0 (no pain) to 10 (worst pain imaginable).

Pain is regarded as mild when it is scored as 1-3/10, it is moderate when scored as 4-7/10, and severe when scored as >7/10.

Pain is regarded as clinically relevant from >4/10.



0 = no pain

10 = the worst pain you can imagine

Figure x. Numerical pain rating scale.

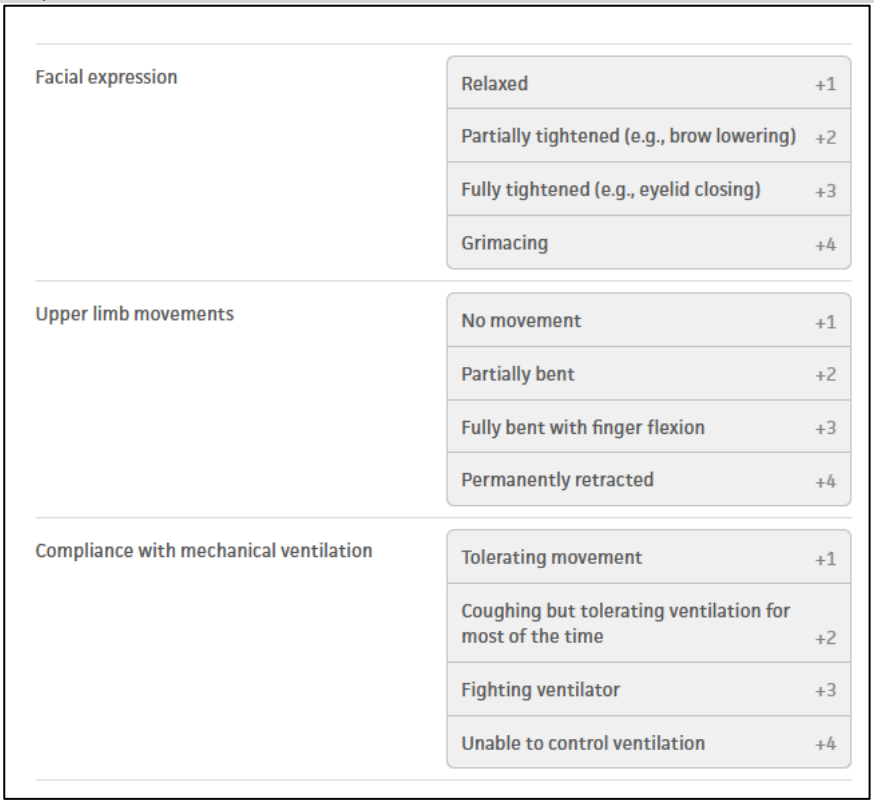
Non-communicating adults

1. **Behavioral Pain Scale (BPS)**
2. **Critical-Care Pain Observation Tool (CPOT)**

1. Behavioral Pain Scale (BPS)

The BPS is intended for assessing pain in intubated adult patients.

- The BPS quantifies pain using body language and patient-ventilator interactions for intubated patients.
- It was developed and validated by performing non-painful procedures (i.e., a central line dressing change) and noxious procedures (i.e., endotracheal tube suctioning) and then observing response patterns.



Facial expression	Relaxed	+1
	Partially tightened (e.g., brow lowering)	+2
	Fully tightened (e.g., eyelid closing)	+3
	Grimacing	+4
Upper limb movements	No movement	+1
	Partially bent	+2
	Fully bent with finger flexion	+3
	Permanently retracted	+4
Compliance with mechanical ventilation	Tolerating movement	+1
	Coughing but tolerating ventilation for most of the time	+2
	Fighting ventilator	+3
	Unable to control ventilation	+4

Score interpretation:

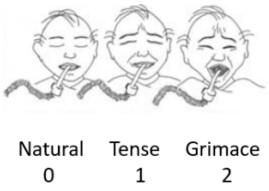
- Scores ≤3 indicate no pain.
- Scores 4-5 indicate mild pain.
- Scores 6-11 indicate an unacceptable amount of pain.*
- Scores ≥12 indicate maximum pain.*

***Note:** For scores ≥6 consider sedation and/or analgesia.

Validated by: Ahlers SJ, van der Veen AM, van Dijk M, Tibboel D, Knibbe CA. The use of the Behavioral Pain Scale to assess pain in conscious sedated patients. Anesth Analg. 2010 Jan 1;110(1):127-33.

2. The **Critical-Care Pain Observation Tool (CPOT)** is designed to assess pain in patients who are unable to communicate verbally, such as those in the ICU or under mechanical ventilation. It evaluates **four behavioral indicators**, each scored from **0 to 2**, giving a **total score between 0 and 8**.

Critical-Care Pain Observation Tool (CPOT)

Indicator	Score 0	Score 1	Score 2
Facial Expression 	Relaxed, neutral	Tense (brow lowering, orbit tightening)	Grimacing (all facial muscles contracted)
Body Movements	No movement or normal position	Slow, cautious movements, protection of one area	Restlessness, thrashing, withdrawal, rigidity
Muscle Tension (Passive flexion/extension of arm)	Relaxed	Tense, rigid	Very tense or rigid, strong resistance
Compliance with Ventilator (intubated) OR Vocalization (extubated)	Tolerating ventilator or talking in normal tone	Coughing, fighting ventilator, sighing, moaning	Asynchronous with ventilator, loud cry, sobbing

Instructions for scoring

- Each indicator is scored from 0–2. Total score range: 0–8.
- 0 = no pain, 1–2 = mild pain, 3–5 = moderate pain, 6–8 = severe pain.
- A change ≥2 points is considered clinically significant.
- Observe patient at rest and during a procedure for comparison.

Score interpretation:

A score of ≥3 indicates pain.

Guidelines on how to use the CPOT

1. To obtain the initial (=baseline) value, the patient should be observed at rest for 1 minute.
2. Then the patient should be observed during procedures known to be painful (e.g., turning over, wound care) to assess changes in behavior due to painful stimuli.
3. The patient's pain should be assessed before and during the peak effect of an analgesic to determine whether the analgesia was effective or not.
4. It is recommended that the highest score observed for each item should be given during the pain intensity assessment.
5. Muscle tension should be assessed last, especially when the patient is at rest, as stimulation of touch (by passive flexion and extension of the arm) can itself lead to a change in behavioral response.
6. All data on the results of pain diagnosis and treatment are subject to mandatory recording in the medical record (medical records are provided in the appendices - Consultation, Dynamic observation (pain treatment), Analgesia card (pain treatment).

Taken from Gélinas el al. Validation of the critical-care pain observation tool in adult patients. Am J Crit Care. 2006 Jul;15(4):420-7

A tool screening for Neuropathic pain DN4 and DN2

Questions 1 and 2 are for interviewing the patient
Questions 3 and 4 are for examining the patient [7]

Опитувальник DN4

Будь ласка, позначте галочкою одну відповідь для кожного пункту в наведених нижче питаннях.

СПІВБЕСІДА З ПАЦІЄНТОМ

Питання 1: Чи відповідає біль, який Ви відчуваєте, одному чи декільком з наступних визначень?

		Так	Ні
1.	**Відчуття печіння**	☐	☐
2.	**Болюче відчуття холоду**	☐	☐
3.	**Відчуття як від ударів струму**	☐	☐

Питання 2: Чи супроводжується біль одним чи декільком з наступних симптомів в ділянці її локалізації?

		Так	Ні
4.	**Пощипуванням, відчуттям повзанням мурах**	☐	☐
5.	**Поколюванням**	☐	☐
6.	**Онімінням**	☐	☐
7.	**Свербіжем**	☐	☐

ОГЛЯД ПАЦІЄНТА

Питання 3: Чи локалізований біль у тій же ділянці, де огляд виявляє один чи обидва наступних симптоми:

		Так	Ні
8.	**Знижена чутливість до дотику**	☐	☐
9.	**Знижена чутливість до поколювання**	☐	☐

Питання 4: Чи можна викликати або підсилити біль в ділянці його локалізації:

		Так	Ні
10.	**якщо провести в цій ділянці пензликом**	☐	☐

Сума балів (кількість відповідей «Так»): _____

Yes = 1
Interpretation of the scale:
If both parts are carried out (=DN4) a score of ≥4 indicates that the patient has neuropathic pain or a neuropathic pain component (in mixed nociceptive-neuropathic pain syndromes).

If only the patient interview section is carried out (DN2) ≥3 indicates that the patient has neuropathic pain or a neuropathic pain component (in mixed nociceptive-neuropathic pain syndromes).

References

1. Buckenmaier, C.C., II, *Acute pain management in the deployed environment.*, in *Military advanced regional anesthesia and analgesia handbook*, K. Buckenmaier C. C. III, M Brookman,J. C. Tighe, P. J. Mariano,E. R. & . Edwards, D, Editor. 2020, Oxford University Press
2. Chou, R., et al., *Management of Postoperative Pain: A Clinical Practice Guideline From the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council.* J Pain, 2016. **17**(2): p. 131-57.
3. Soliman, N., et al., *Pharmacotherapy and non-invasive neuromodulation for neuropathic pain: a systematic review and meta-analysis.* Lancet Neurol, 2025. **24**(5): p. 413-428.
4. Office, V.P.B.M.S.M.A.P.V.P.E.V.N.E.M., *Ketamine for the management of acute pain in VHA emergency departments and urgent care centers: National protocol guidance (Revised March 2024)*. 2024.
5. Department of Veterans Affairs, D.o.D., *VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE USE OF OPIOIDS IN THE MANAGEMENT OF CHRONIC PAIN*. 2022, Department of Veterans Affairs & Department of Defense.
6. Heller, K., Maramara, T., Perry, M. . *GABAPENTIN FOR ACUTE POSTOPERATIVE PAIN. Evidence Based Medicine Guideline*. 2016 2023; Available from: www.surgicalcriticalcare.net.
7. Bouhassira, D., et al., *Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic questionnaire (DN4).* Pain, 2005. **114**(1-2): p. 29-36.